

Appl. No.10/565,044; Docket No. US03 0251 US2
Amdt. dated November 30, 2006
Response to Office Action dated October 31, 2006

Amendments to the Specification

On page 5, lines 1-25, please amend as shown.

conductive portion 260 upon which an insulating material 245 is disposed thereon, is bonded to the substrate 210 via bonds 250a, 250b, 250c. The arch 270 bends at its center, providing an additional bonding point. In this instance, the arch is bonded on its insulating material 245. Bonds 250a and 250c are not connected to solder balls 205 through a ground trace, therefore the arch is not electrically grounded, and it is possible to attach it about the center of the die having active circuits. However, the conductive material in the arch provides a path to dissipate heat generated by the semiconductor device die 230. The device design and packaging process dictates the desirability of the non-electrically connected bonding. The bonds 250a, 250b, and 250c are glued with an adhesive suitable to provide a sufficient mechanical connection of the arch. The dielectric material chosen may be selected to have desirable heat transfer characteristics and compatibility with the adhesive used. To protect the integrated circuit device contents, the package is sealed in a suitable encapsulation 280, shown by the dashed line in the drawing.

Referring to FIG. 4, in another embodiment of the present invention, the style of arch, as depicted in FIG. 3, may be electrically bonded to the package. An integrated circuit device includes a structure 300 has a semiconductor device die 330 attached to substrate 310. Wire bonds 320 couple die pad landings 315 to package landings 325. On the underside of package substrate 310, solder balls 305 are coupled to package substrate 310 ground traces 340a and 340b. Upon these ground traces 340a and 340b, the ground arch 370 is coupled thercon via conductive bonds 350a and 350b at points in which the dielectric material 245 of the ground arch 370 has been opened to expose the ground arch's conductive material 260. In a particular example embodiment, these conductive bonds 350a and 350b may be solder balls. However, these conductive bonds 350a and 350b may also include conductive epoxy, gold compression bonds, ultrasonic welds, etc. In addition to the conductive bonds 350a and 350b, the die 330 has a grounding region 380 about the center, upon which an additional conductive bond 350c may be attached. To attain this configuration, the user would plan the layout of his or her IC design so that a grounding region 380 may be built about the center of the semiconductor device die

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330. This ground would be incorporated into the design of a particular IC device early in the design process. If the design does not permit a centered grounding region the grounding regions may be placed, for example, in different quadrants of the semiconductor device die. To protect the integrated circuit device contents, the package is sealed in a suitable encapsulation 390, shown by the dashed line in the drawing.